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Bell Labs Innovations

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

By Hand

Mr. William F. Caton
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20544

Re: CC Dkt. 94-102/ Enhanced E-911 Emergency Calling Systems

Dear Mr. Caton:

Enclosed please find an original and five (5) copies of comments for filing in the above-referenced proceeding. Please date-stamp and return one of the copies for our files.

Please do not hesitate to contact me should there be any questions.

Sincerely,

David B. Jeppsen

cc: Peter Wolfe (2025 M Street, Room 7122-C)
ITS

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of,	)	
	)	
Revision of the Commission's Rules,	)	CC Docket No. 94-102
To Ensure Compatibility With	)	RM-8413
Enhanced 911 Emergency Calling Systems	)	
	)	

Comments of Lucent Technologies Inc.
in Response to
Further Notice of Proposed Rulemaking

Lucent Technologies Inc. ("Lucent") submits these comments in response to the Commission's Report and Order and Further Notice of Proposed Rulemaking in CC Docket 94-102, released July 26, 1996 (hereinafter the "NPRM").

In its regulatory flexibility analysis (NPRM, Appendix B), the Commission describes the NPRM as addressing the following issues:

> "One objective of this Further Notice is to collect additional information on the technical issues related to the improvement of wireless E911 services, including higher accuracy standards for the Automatic Location Identification (ALI), a latency period requirement, and the provision of 911 services without interruption where one wireless provider does not provide complete area coverage. Another objective is to collect information with respect to informing consumers what their wireless phones can and cannot do. A third objective is to determine whether all 911 calls should be transmitted without any preconditions."

Lucent will confine its comments to these points.

Lucent -- formed as a result of AT&T's divestiture of its systems and equipment businesses* -- is a leading global manufacturer of telecommunications systems, equipment, software and related services with the predominant share of its revenues coming from sales to telecommunications infrastructure providers in the United States and abroad. Lucent designs, builds and delivers a wide range of public and private networks, communications systems and software, consumer and business telephone systems and microelectronics components. Bell Laboratories, the research and development arm for the company, is widely regarded as one of the world's foremost technology research and development organizations. Bell Labs' scientific contributions include the transistor, the laser, the solar cell, the communications satellite, cellular telephony, and electronic switching. The AMPS technology originated in Bell Labs, and today Lucent is one of the principal suppliers of wireless infrastructure and handsets, covering all available technologies.

In general, Lucent believes that the public interest would best be served by avoiding detailed prescriptive mandates which do not consider Phase I and II experience. For example, the Commission proposes to adopt a standard of 90 percent ALI

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* Lucent has recently gone through an initial public offering under which 17.6% of its stock is now publicly traded. The balance of its stock is held by AT&T which will distribute all such shares to AT&T stockholders in late September 1996.

accuracy, within a radius of 40 feet, at the end of five years and seeks comment on the reasonableness of its estimate that this requirement will be then feasible (NPRM para. 138). It asks commenters to assess the current state of relevant technology, and to evaluate assumptions that can be made with respect to the evolution of this technology during the next five years. The standard applies to longitude, latitude and vertical location data, and is premised on requests for such service from a PSAP capable of using the location data and the existence of a cost recovery mechanism.

Lucent agrees with the Commission that the 90%/40 foot target may well be desirable from a public service perspective, but respectfully suggests that it is too early to impose such requirements as a mandate, even if only effective after five years. Lucent is aware of no proven technology to meet this accuracy and reliability, even with modification to mobile terminals. Under real world conditions -- which involve calls addressable by only one cell site (especially in rural areas) and high levels of multipath propagation (especially in urban areas) -- substantial trials and testing will be necessary before a rational cost-benefit analysis can be used to determine the appropriate standards to apply.

The cost-benefit analysis necessarily will need to take into account both the public service value of higher accuracy location and the costs required to achieve the specific standard to be

mandated. Once empirical evidence is available, it may show that a minimal decrease in either accuracy or reliability may result in an order of magnitude decrease in capital investment. For example, it is entirely possible that a 40 foot accuracy requirement entirely precludes use of certain technologies which could sharply reduce additional investment or afford other benefits, such as permitting use of existing handsets. Rather than *a priori* establishing arbitrary requirements, however desirable from a public service standpoint, the Commission should use actual experience and empirical evidence to evaluate the merits of various alternatives prior to mandating any specific standard. Any reduction or improvement from the proposed Phase II targets should similarly be based on evidence as to the additional utility which would result from any improvement.

For example, Global Positioning Systems (GPS) currently have the most promise in meeting the 40 foot latitude and longitude requirement. The ninety percent reliability requirement* for surface location, however, is far beyond current

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* Details of the measurement of the reliability requirement could have a significant impact on the technology and investment required to meet such a standard. Issues such as whether the percentage reliability would be measured as a system average or for each portion of the system; whether it would be based on peak hour traffic or full day averages; whether it would be an initial eligibility requirement or would be required to be maintained on a regular reporting basis; and how a measurement would be treated if it accurately reported latitude and longitude but failed to accurately provide altitude information could all significantly affect the technology and its application. Similarly, the minimum duration of a call included in the statistics could dramatically affect the technology. For example, current reasonably priced GPS receivers require some time for satellite acquisition in almost all conditions. If calls of exceedingly short duration are counted towards the 90% reliability requirement, such a technology may be entirely ruled out.

GPS capabilities at reasonable cost. In particular, GPS position fixing is based on satellite acquisition which is often difficult to achieve, particularly in urban environments and in buildings.* Indeed, Lucent believes that it is highly unlikely that any currently proposed ALI technologies can meet a 67% reliability standard across all terrain within the 5 year time frame addressed in the NPRM. Hence Lucent urges that statistically relevant experience with Phase II systems should be evaluated and used as a basis for developing an appropriate further standard for both radius and reliability.

The Commission also seeks comment on altitude information requirements. (NPRM para. 140). It is apparent that vertical location is important primarily in high rise buildings, and therefore is of more importance in urban areas.† Terrestrial location systems which use triangulation are inherently limited in their ability to provide vertical location information. With present technology, an airborne or satellite reference is required to provide location in the vertical dimension. For example, GPS can provide three dimensional location. However, as noted earlier, GPS is not well suited to urban environments as it is often difficult to view a sufficient number of satellites to obtain a lo-

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* Location information should be available during call setup for accurate routing. If detailed information is unavailable immediately, then coarse location could be used for routing.

† It is also probable that vertical positioning is more important for emergency services in residential areas than in areas comprised primarily of office buildings.

cation. Thus, in the very places where vertical location would be most useful, GPS encounters the most difficulty.

An alternative to GPS for the vertical dimension would be to deploy radio beacons in high rise buildings that would in some manner broadcast the altitude or floor number associated with the user. Again, standardization of this technology would be critical for its success. A beacon solution would be very expensive, and would also have to overcome local obstacles, such as transmitter location and changes to building codes, to assure deployment on a wide scale. Once again empirical experience as the technology develops will enable the Commission to make the appropriate cost benefit analysis if it avoids prescriptive rules at this early stage of technological development.

Another example of the prematurity of *a priori* rules relates to the duration of the latency period, which should be deferred to appropriate standards bodies for study and recommendation. Lucent does not believe that an update period should be prescribed, but rather that PSAP equipment should have the option of requesting the wireless system to perform location updates as needed. In cases where location information updates are unnecessary, such as reports of roadside accidents by third parties or calls from stationary handsets, there is no need to unnecessarily burden the network with extraneous update information.

In principle, Lucent supports the concept of meeting the public need for 911 calls where the subscribed system does not

have an adequate signal. Such regulation should not, however, require such phones to interconnect with systems with incompatible air interface technology. Rather, Lucent recommends that the mobile phone give preference to its home or preferred system to service the 911 call if the signal is adequate to carry a call, even if the home system signal is not the strongest in the area of the call. This would provide more equitable distribution of 911 calls among carriers, particularly considering that PCS will use weaker signals for transmission. Moreover, this would avoid substantial additional handset costs which would undoubtedly be passed on to consumers.

The Commission seeks comment on whether it would be appropriate to give local PSAPs the option of obtaining location information in three dimensions.(NPRM para. 140) Lucent does not believe that there is a need to selectively deliver location data (e.g., altitude) to a PSAP. Rather than place the burden on carriers, carriers should be permitted to deliver all data. PSAP telecommunications equipment could selectively screen incoming messages to eliminate whatever data its equipment is not able to decipher.

The Commission also seeks comment on whether carriers should be obligated to transmit all non-code calls, even without PSAP request (NPRM Section 149). Selectively routing non-code 911 calls to some PSAPs and screening them off for other PSAPs would put an undue burden on the wireless networks to add intelligence

to the MSC in order to discriminate between such calls. Considering the small number of non-code calls, little benefit would be provided for the substantial cost involved. A single decision for whether or not to route non-code calls should be applied to all PSAPs served by a single MSC.

As a vendor, Lucent is ready and willing to meet the needs of its customers for systems, the regulatory requirements that may be imposed and the public service needs of both end user customers and PSAPs. However, Lucent believes that prescriptions of requirements must necessarily take into account technical and economic limitations of all wireless providers which are part of the current and future environment, and should be based on cost benefit analyses which cannot be meaningfully done without further technological development, experience and study. Existing standards bodies, such as the Telecommunications Industry Association TR45.2 Emergency Services Ad Hoc Committee provide one important vehicle for developing and evaluating proposals and for providing input into future Commission rulemaking. Thus, while Lucent fully supports the thrust of the NPRM in improving accuracy of automatic location information for wireless 911 service, Lucent believes that the Commission should avoid premature prescription of standards, and should rather evaluate the experience of Phase I and II in deciding applicable rules for the future.

Respectfully submitted,

LUCENT TECHNOLOGIES INC.

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Dated: September 25, 1996